Aditya Saraf

as2777@cornell.edu | (425) 697 – 0256

https://adityasaraf.github.io/

RESEARCH INTERESTS

Blockchain incentives, consensus algorithms, decentralization, behavioral economics, epistemology

EDUCATION

CORNELL UNIVERSITY, Ithaca, NY	August 2021–May 2026 (expected)
Doctor of Philosophy in Computer Science (expected)	
UNIVERSITY OF WASHINGTON, Seattle, WA	June 2020
Master of Science in Computer Science, GPA: 3.98	
UNIVERSITY OF WASHINGTON, Seattle, WA	June 2019
Bachelor of Science in Computer Engineering, Magna cum laude, GPA: 3.86	

- Minor: Philosophy
- Phi Beta Kappa (ΦΒΚ) member

RESEARCH POSITIONS

RESEARCH INTERN, Category Labs (Monad)	May 2025–August 2025
Completed *Timing Games in Responsive Consensus Protocols*, started working on spam	
RESEARCH ASSISTANT, University of Michigan	October 2020–September 2021
Funded by Grant Schoenebeck to work on Bayesian differential privacy (see below)	
RESEARCH SCIENTIST, University of Washington	June 2020–September 2020
Funded by Anna Karlin to work on time-inconsistency in planning problems (see below)	

PAPERS

Published/Forthcoming:

1. Joe Halpern, Aditya Saraf. *Chunking Tasks for Present-Biased Agents*. EC'23.

2. Conor Mayo-Wilson, Aditya Saraf. *Collectivist Foundations for Bayesian Statistics*. Forthcoming in *Philosophers' Imprint.*

3. Darshan Chakrabarti, Jie Gao, Aditya Saraf, Grant Schoenebeck, Fang-Yi Yu. *Optimal Local Bayesian Differential Privacy over Markov Chains*. AAMAS'22.

4. Aditya Saraf**,** Anna Karlin, Jamie Morgenstern. *Competition Alleviates Present Bias in Task Completion.* WINE 2020.

5. Emily McReynolds, Sarah Hubbard, Timothy Lau, Aditya Saraf, Maya Cakmak, and Franziska Roesner. 2017. *Toys that Listen: A Study of Parents, Children, and Internet-Connected Toys*. CHI '17

In submission/preprints:

6. Andrés Fábrega, James Austgen, Samuel Breckenridge, Jay Yu, Amy Zhao, Sarah Allen, Aditya Saraf, Ari Juels. *The CoinAlg Bind: Profitability-Fairness Tradeoffs in Collective Investment Algorithms*. In submission at USENIX.

7. Kaya Alpturer, Kushal Babel, Aditya Saraf. *Timing Games in Responsive Consensus Protocols*. In submission at CCS.

8. Joe Halpern, Rafael Pass, Aditya Saraf. *Fair Interest Rates Are Impossible for Lending Pools: Results from Options Pricing*.

9. Conor Mayo-Wilson, Aditya Saraf. *Scientific Evidence and the Duty to Disclose*. In submission at *Philosophy of Science*.

10. Conor Mayo-Wilson, Aditya Saraf. *Robust Bayesianism and Likelihoodism*. Early draft presented at FEW 2019. In submission at *Statistical Science.*

HIGHLIGHTED PROJECTS

THROUGHPUT VS CENSORSHIP WITH MULTIPLE (RATIONAL) CONCURRENT PROPOSERS	September 2025–current
With Fatima Elsheimy, Giannis Kaklamanis, and Sarisht Wadhwa (Yale)	

- Studied the *economic censorship resistance* (eCR) of different consensus algorithms, by defining a bribery-based censorship model against rational proposers
- Found that multiple concurrent proposers (MCP) can significantly increase the eCR as compared to a single-proposer system
- Designed an algorithm to compute equilibria in this model, and used it to compare the eCR vs. throughput tradeoffs across different transaction fee mechanisms

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CURBING SPAM TRANSACTIONS WITH PRIORITY FEE ORDERING   July 2025–current

With Kushal Babel (Category Labs), Lioba Heimbach (Category Labs), Wenhao Wang (Yale) and Fan Zhang (Yale)

- Modeled the expected volume of speculative backrunning (i.e., spam), given a user demand curve for gas, the block capacity, and the value of MEV opportunities
- Found that spam limits scaling, by lowering user welfare by a constant fraction, even as the user demand and block capacity scale
- Showed how priority fee ordering, as opposed to first-come first-serve sequencing, would dramatically lower the expected spam volume

MITIGATING TIMING GAMES WITH VOTED TIMELINESS REPORTS   May 2025–September 2025

With Kaya Alpturer and Kushal Babel (Category Labs)

- Analyzed timing games, where block proposers delay proposals to maximize MEV, which can threaten responsiveness
- Designed a *voted timeliness* system, where validators vote on each other's round durations; lower delays earn more block reward
- Proved that our system eliminates timing games in a Nash equilibrium, and proved several coalition-resistant properties as well
- Responsive protocols can implement our solution *more robustly*, showing that responsiveness helps eliminate timing games, rather than timing games defeating responsiveness.
- Using real-world data, we show that our system only slightly increases low-latency incentives among validators

PRICING LENDING POOLS WITH OPTIONS   July 2022–May 2024

With Rafael Pass and Joe Halpern (Cornell)

- Used Black-Scholes models to price interest rate, collateralization, and liquidation parameters for lending pools, borrowing ideas from options pricing
- Proved that "fair" interest rates are impossible for lending pools in our model; the pools are always borrower-favored
- Used recursive barrier options to model the ability of borrowers to "top-up" their loans to prevent liquidation
- Investigated lending pools in practice, showing what discount rates are implied by the existing pool parameters

QUALITATIVE PROBABILITY FOR STATISTICAL PRINCIPLES   January 2019–current

With Conor Mayo-Wilson (UW)

- Worked within a formal system of qualitative conditional probability to prove statistical principles
- Showed that Bayesian foundations (of algorithms, decision theory, etc.) apply even when agents might lack quantitative degrees of belief
- Introduced a new theory of evidence based on widespread agreement that generalizes existing theories of evidence to broader settings
- Connected ethical definitions of evidence to the common statistical definitions, show how existing statistical theories can determine when one ought to disclose evidence

TEACHING EXPERIENCE

HIGH SCHOOL RESEARCH MENTORSHIP   Summer 2022 –current

I've done 1-on-1 research mentoring for over 30 high school students, on a wide range of topics, including historical economics, machine learning, philosophy, and more. Several of my students have published papers, and won science fairs. I've worked with Polygence, Lumiere, College Impact, and similar programs.

FOUNDATIONS OF COMPUTING I, UW (CSE 311), Instructors: Kevin Zatloukal, Emina Torlak   Fall '18

The first class in the major, teaching the basics of logic, discrete math, and formal languages.

INTRODUCTION TO ALGORITHMS, UW (CSE 421), Instructors: Various; Cornell (CS 4820), Instructor: Anke Van Zuylen

Spring '18, Winter '19, Spring '19, Fall '22

An upper division algorithms class taught primarily to juniors/seniors.

CRYPTOGRAPHY, UW (CSE 490C), Instructor: Huijia (Rachel) Lin; Cornell (CS 4830), Instructor: Noah Stephens-Davidowitz

Fall '19, Spring '22

An upper division class on formal cryptography.

INCENTIVES IN COMPUTER SCIENCE, UW (CSE 590/490Z), Instructor: Anna Karlin   Winter '20, Spring '20

A class for master's students and advanced undergraduates that surveys topics between economics and computation.

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ENGINEERING EXPERIENCE

DONUTS INC., Seattle, WA   June 2020–August 2021
Software Engineer
- Worked on a registry system that handles over 200 Top Level Domains (TLDs)
- Built a TLD import service, which is the technology that allows Donuts to acquire and merge TLDs from competing registrars

AMAZON, Seattle, WA   June 2017–September 2017
Exports and Expansion Technology – Customer Experience

Software Development Engineer Intern
- Created a full stack application with Spring MVC (Java), including a web-based frontend server and a RESTful backend service.
- Had end-to-end ownership – discovered (internal) customer requirements; planned and designed the application; developed, tested and deployed the application to production.
- Reduced deployment cycle from 2-4 weeks to instant changes to production.